would cause an augmentation of its angular velocity around the sun. The period of revolution would take less time, and the length of the year would gradually decrease. Observation proves that this is not the case, and the necessary conclusion is, that there is no resisting medium in space, which must be, therefore, considered as perfectly void.

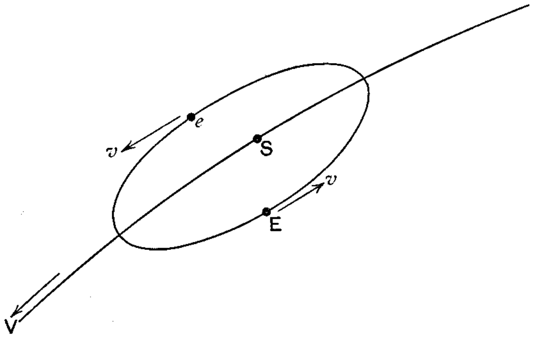
There is no objection to be made to this reasoning so long as we suppose the sun immovable in space, which was the generally accepted belief in Newton's time. But we know at present that the sun, with all the planets, has a motion through space; and this knowledge changes the conditions of the problem, as may be demonstrated by what follows.

In the accompanying figure, S is the sun in a certain point of its orbit in space. E is the earth in a certain point of its orbit around the sun. Let the linear velocity of the sun in its orbit be V, and the linear velocity of the earth in its own orbit be v.

When the earth is on one side of the sun's orbit, say in E, then V and v are opposite in direction, and the absolute velocity of the earth in space will be $\mathrm{V} - v$. When the earth is on the other side of the sun's orbit, say in *e*, then V and v have the same direction, and the absolute velocity of the earth will be $\mathrm{V} + v$.

Now it seems evident that we have here what may be called a self-acting regulation of the angular velocity of the earth in its orbit around the sun. For the absolute linear velocity of the earth is periodically accelerated and retarded, and the mean velocity would remain exactly constant if the sun's orbit were a straight line.

Most probably the sun's orbit through space will prove to be a curve. If this is the case, then the part of the earth's orbit on the concave or outer side of the sun's orbit will be somewhat longer than the part on the convex or inner side.



If this be so, then the acceleration on the outside part will be somewhat greater than the retardation on the inner side of the earth's orbit. Thus the surplus velocity, gained in each revolution around the sun, will compensate the loss of linear velocity which the earth might suffer in its yearly orbit around the sun by the resistance of a supposed medium in space.

It might, however, be asked, Why it is that this compensation is so exact as we find it to be? For Laplace, in his well-known work on the "Système du monde," explains clearly that no change in the period of revolution of the earth around the sun has been observed.

But we may quite as well wonder why the temperature of our blood is nearly constant; and the best answer to such questions is in the well-known words: "Philosophy does not ask what agrees, but what is."

The sun's motion in space is a discovery with far-reaching consequences for science in general; and if space be allowed, a few other corollaries must follow upon it. For the present, it is better to limit research to the single question as to whether we may admit the existence of a resisting medium in space. The answer is that the discovery of the sun's motion in space allows us to settle this much disturbed question in a positive sense.

This result has a particular value, because it takes away the contradiction between two theories which are both generally admitted. The undulatory theory of light, which was first enunciated by Huygens, supposes the existence of an elastic medium in space. When it is demonstrated that the supposition of this medium is not incompatible with Newton's theory of central forces as applied to our planetary system, this must certainly be considered as a step in advance.

A. Huet.

Delft, Holland, July 5

THE INTERNATIONAL CATALOGUE OF SCIENTIFIC PAPERS.

The following report of the International Catalogue Committee was presented to the President and Council of the Royal Society on July 5, and the recommendations contained in it were approved.

At the first meeting of this Committee (February 8, 1894), the Memorial to the President and Council (July 1893) which led to the appointment of the Committee, and the Minute of Council of December 7, 1893, appointing the Committee, having been read, it was resolved to request the President and Council to authorise the Committee to enter directly into communication with societies, institutions, &c., in this country and abroad, with reference to the preparation, by international cooperation, of complete subject and authors' catalogues of scientific literature.

Subsequently, a draft circular letter was prepared, which, on February 22, 1894, received the approval of the President and Council, who also authorised its issue.

This letter was sent to 207 societies and institutions selected from the exchange list of the Royal Society, and to a few others. It was also sent to the Directors of a number of Observatories and of Government geological surveys, to the Foreign Members of the Royal Society, as well as to those of the following Societies:—Chemical, Geological, Physical, Royal Astronomical, Linnean, Royal Microscopical, Entomological, Zoological, Physiological, and Mineralogical, and of the Anthropological Institute. A special letter was addressed to the Smithsonian Institution.

More than a hundred replies to the letter have been received; several of these are reports of Committees specially appointed to consider the suggestions put forward by the Royal Society. A list of answers received up to December 1894, with brief excerpts from the more suggestive, was issued to members of the Committee early in this year. It should, however, be added that from some important institutions no answer has as yet been received.

It may be said at the outset that in no single case is any doubt expressed as to the extreme value of the work contemplated, and that only two or three correspondents question whether it be possible to carry out such a work. It is a great gratification to the Committee that the matter has been taken up in a most cordial manner by the Smithsonian Institution, the Secretary of which, in his reply, refers to the desirability of a catalogue of the kind suggested as being so obvious that the work commends itself at once. The importance of having complete subject catalogues, and not mere transcripts of titles, is also generally recognised.

Some bodies and individuals take the matter up very warmly and urge that steps be taken forthwith to put the scheme into action, this being especially true of the replies received from the United States; others, while giving a general approval, dwell upon the difficulties of carrying out the suggestions put forward; and others, again, ask for more details before committing themselves to any answer which may seem to entail future responsibility, especially of a financial character.

Incidentally it may be pointed out as very noteworthy that over and over again reference is made to the great value of the Royal Society's "Catalogue of Scientific Papers." There is abundant evidence that considerable use is made of this on the continent of Europe. And it is clear that a proposal to carry out a more comprehensive scheme initially under the direction of the Royal Society of London is likely to meet with general approval owing to the fact that the Society is credited with having already carried out the most comprehensive work of the kind yet attempted. Indeed, the Academy of Natural Sciences of Philadelphia, U.S.A., directly advocates the

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establishment of a central bureau under the Royal Society; and several others more or less clearly imply that they would favour such a course.

Over and over again, it is stated that the production by international co-operation of a catalogue such as is contemplated is not only desirable, but practicable. The Americans who, as already stated, are the most enthusiastic supporters of the scheme, especially dwell on the importance of early action being taken. Prof. Bowditch, of Harvard University, in particular, points out that if the Royal Society of London wish to guide the enterprise, it ought to announce its views and put forward a comprehensive scheme with the least possible delay. It may be added here that he also urges that in determining the scope of the catalogue a very wide interpretation should be given to the word "Science."

No very precise information as to the best mode of putting the scheme into operation is to be gathered from the replies as a whole.

It is generally agreed that the enterprise should be an international one. Many think that international financial support should and would be accorded to it, but no method of securing this is indicated; others express the view that the cost may be met by subscriptions from societies, libraries, booksellers and individuals without Government aid, and this is, perhaps, on the whole, the prevailing feeling among those who have discussed the matter from a financial point of view. But in no case is any attempt made to form any exact estimate of the cost.

A number of scientific bodies and institutions express themselves prepared to work in such a cause. The Secretary of the Smithsonian Institution suggests that as the Institution receives all the serials and independent works published in America, a branch office might be established there, and that it is not impossible that a sum of money might be given yearly in aid. The Royal Danish Academy is willing to render as much assistance as possible. It would charge an official of one of the Danish chief libraries in receipt of all Danish publications with the task of editing slips, and would defray the cost of this work. The Société des Sciences of Helsingfors would furnish the central office with information as to the scientific work done in Finland. The Kongl. Vetenskaps Akademie of Stockholm would organise a Committee for Sweden.

As regards language, there appears to be more unanimity than could have been expected. Over and over again the opinion is expressed that English should be the language of the subject catalogue. Frequent reference is made to the importance of quoting titles in the original language, although some suggest that this should be done only in the case of those published in English, French, or German, and perhaps Italian.

Some form of card catalogue appears to be generally favoured, especially in America, as the basis of the scheme; the Committee of Harvard University, whose reply is very full, in particular discuss this point in detail.

In an interview with the Committee in March last, Prof. Agassiz spoke very warmly in favour of the scheme, and of the support which it would meet with in the United States, especially from libraries. As others have done, he strongly urged that the co-operation of booksellers and authors should be secured. Prof. Agassiz also expressed the view that the regular issue to libraries and scientific workers from the central office of cards or slips which would afford the material for the construction of card catalogues would form an important source of income, at all events in his country.

From various sides it is urged that an International Congress should be held to discuss plans. This is advocated as a first step in a reply received from the Königl. Gesellschaft der Wissenschaften in Göttingen, a reply to which, not only as regards this point, but also in respect to the whole matter, the Committee attach very great weight, since it embodies in an official form views arrived at by the academies of Vienna and Munich, and by the scientific societies of Leipsic and Göttingen, who have considered the matter in common. Prof. Agassiz strongly urged the calling of a conference, and among others who share this view, Dr. Gill, of the Cape Observatory, in his letter particularly dwells on the great value of such meetings as the means of securing unanimity of action.

Such being the tenour of the correspondence, your Committee are convinced that initial steps of a definite nature in furtherance of the scheme ought now to be taken.

They accordingly request the President and Council to take measures with the view of calling together, in July of next year (1896), an International Conference, at which representatives of the several nations engaged in scientific work should be invited to attend, with the view of discussing and settling a detailed scheme for the production by international co-operation of complete authors' and subject catalogues of scientific literature.

London will probably be found the best place in which to hold such a conference. It may be desirable to summon the representatives of the different countries through their respective Governments, and it will obviously be necessary that a detailed scheme be prepared, to serve as a basis for discussion at the conference. These and other points will require much consideration before any action at all can be taken; meanwhile, it is desirable that a beginning should be made during the autumn, before the winter session of the Society. The Committee therefore recommend that the President and Council should give the Committee (which includes the President and officers) executive powers in order that they may take, in the name of the Society, such steps as they may think desirable with the view of calling together the above-mentioned conference.

SCIENCE SCHOLARSHIPS AT CAMBRIDGE.

WITHIN the past academical year an attempt has been made by the college tutors at Cambridge, in consultation with representatives from Oxford, to come to an understanding as to the times at which examinations for entrance scholarships shall be held. Headmasters have frequently complained of the interruption to school work caused by the present somewhat haphazard arrangements, and have suggested the grouping of colleges and other expedients in mitigation of the difficulty. Some of the colleges, notably Caius, Jesus, Christ's, and Emmanuel, Pembroke with King's, and Clare with Trinity Hall, have agreed to group their examinations, candidates entering for the combined examination being required to indicate the colleges, in the order of their preference, which they desire to join if successful. The larger colleges, Trinity and St. John's, have for various reasons found it impracticable to form such combinations; but they have agreed at least to avoid clashing by fixing their examinations about a month apart. Nine of the colleges offer scholarships and exhibitions for natural science, the rest confining the competition to the old-established subjects of classics and mathematics. In the ensuing academical year, examinations in natural science for these awards will be held as follows: at Trinity, November 5; at Peterhouse (physical sciences only), November 19; at the group—Caius, Jesus, Christ's, Emmanuel—November 26; at the group—Pembroke, King's—and also at St. John's College, December 3; at Sidney, Sussex, December 12; at the group—Clare, Trinity Hall—January 1; and at Downing, about March 17. The value of the scholarships varies from £80 to £40 a year, of the exhibitions from £50 to £20. They are usually tenable for three or four years, with a condition that by the end of the second year the scholar shall have

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